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IS 6305-1 (1980): Safety code for powered industrial trucks, Part 1 Application, operation and maintenance [TED 22: Transport Tractors and Trailers]



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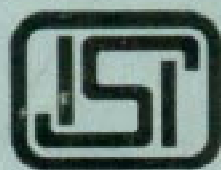
SAFETY CODE FOR
POWERED INDUSTRIAL TRUCKS

PART I APPLICATION, OPERATION AND MAINTENANCE

(*First Revision*)

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

*Indian Standard*SAFETY CODE FOR
POWERED INDUSTRIAL TRUCKS

PART I APPLICATION, OPERATION AND MAINTENANCE

(First Revision)

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Indian Standard

SAFETY CODE FOR POWERED INDUSTRIAL TRUCKS

PART I APPLICATION, OPERATION AND MAINTENANCE

(First Revision)

0. FOREWORD

0.1 This Indian Standard (Part I) was adopted by the Indian Standards Institution on 28 November 1980, after the draft finalized by the Industrial Trucks Sectional Committee had been approved by the Marine, Cargo Movement and Packaging Division Council.

0.2 Correct operation and regular maintenance are very important for powered industrial trucks for preventing damage and deterioration of equipment, reducing the risks of accidents, and thereby ensuring safety of personnel. This standard has been prepared to act as a guide for the user for application, operation and maintenance of powered industrial trucks.

0.3 The safety requirements for design and manufacture of industrial trucks are given in Part II of this standard.

0.4 This standard was first published in 1971. Revision of this standard has been taken up to align it with ISO/3691-1977 'Powered Industrial Trucks—Safety Code', issued by the International Organization for Standardization (ISO).

1. SCOPE

1.1 This standard (Part I) covers the safety requirements for application, operation and maintenance of powered industrial trucks.

1.2 This standard does not cover requirements for industrial tractors.

2. TERMINOLOGY

2.0 For the purpose of this standard, in addition to the terms and definitions given in IS : 4660-1977* and IS : 7570-1975† the following definition shall apply.

*Glossary of terms relating to powered industrial trucks.

†Glossary of terms relating to fork arms and attachments of forklift trucks.

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2.1 User — The user is defined as the owner or the person or company to which the truck is hired.

3. OPERATING SAFETY RULES AND PRACTICES FOR THE USER

3.1 Operator's Qualifications

3.1.1 Only trained and authorized operators shall be permitted to operate powered industrial trucks.

3.1.2 Operators of powered industrial trucks shall be physically fit and hold valid licence for heavy duty vehicles issued by the respective local transport authority.

3.2 Operation in Hazardous Areas

3.2.1 Only those industrial trucks which are of types approved for use in such environments by a responsible agency or the national authority shall be used. Such trucks shall be clearly marked with an appropriate type sign and the building(s) and area(s) involved shall be clearly marked.

3.2.2 Classification of hazardous areas shall be in accordance with IS : 8790 (Part I)-1978* and IS : 8790 (Part II)-1978†.

3.3 Passengers

3.3.1 Passengers shall not ride trucks except where a specific provision is made to accommodate them.

3.3.2 Riding by passengers is not permitted on a truck when fitted with a work platform except under the following conditions:

- a) The platform shall be secured to the lifting carriage and the forks.
- b) When personnel are on a platform not equipped with elevating controls, the operator shall be operator's position on truck.
- c) Only the elevating controls on the platform shall be used when personnel are on a platform equipped with elevating controls.
- d) The combined mass of the platform, load and personnel shall not exceed one-half of the truck lifting capacity as indicated on the truck capacity plate.
- e) The truck shall not be used to transport personnel on the platform. This shall not prohibit small positional adjustments necessary for work in hand.

*General requirements of powered industrial trucks working in hazardous areas:
Part I Internal combustion engine powered trucks.

†General requirements of powered industrial trucks working in hazardous areas:
Part II Electric battery powered industrial trucks.

3.4 Truck Operation

3.4.1 Capacity Modification and Marking

3.4.1.1 The manufacturer's rated capacity of the truck shall not be exceeded.

3.4.1.2 Any design modifications and additions liable to influence capacity and operation shall be effected only after the approval of the manufacturer.

3.4.1.3 Modifications arising from application of ancillary attachments shall be performed in such a manner that safety is not reduced and is in accordance with the provisions of this code. Capacity, operation and maintenance instruction plate, tags, or labels should be changed accordingly.

3.4.1.4 The user shall ensure that all name-plates and markings are in place and are maintained in a legible condition.

3.4.2 Stability

3.4.2.1 The stability conditions for industrial trucks shall be in accordance with IS : 4357-1974*, IS : 7309-1973†, IS : 7552-1974‡, IS : 7631-1975§ and IS : 9075-1979||. If operating conditions differ from those as the normal operating conditions the loads shall be reduced.

3.4.2.2 Trucks equipped with attachments shall be considered as partially loaded trucks when operated without a load.

3.4.3 Protective Requirements and Devices

3.4.3.1 Trucks shall be of a colour which contrasts with the surroundings.

3.4.3.2 High-lift rider trucks shall be equipped with an overhead guard, with the exception, however, of high-lift rider trucks used where the operating conditions preclude the use of such overhead guards.

3.4.3.3 When high-lift trucks are used to handle loads likely to fall on the operator (for example high or segmented loads), a load back-rest extension having height, width and size of openings sufficient to minimize the risks of loads or parts of it falling towards the operator shall be used.

*Methods of stability testing of forklift trucks (*first revision*).

†Stability tests for reach and straddle trucks.

‡Stability tests for trucks operating in special conditions.

§Stability tests for pallet stackers and high lift platform trucks (pedestrian & rider controlled).

||Stability tests for side loader trucks.

3.4.3.4 When operating conditions indicate, the trucks shall be equipped with additional warning devices, such as lights and blinkers.

3.4.3.5 Steering knobs shall not be attached to the steering wheels of industrial trucks not originally provided with such items, unless approved by the manufacturer of the truck.

3.4.4 *Fuel Handling and Storage*

3.4.4.1 Trucks shall be refuelled only at locations designed for that purpose. The locations shall be ventilated to minimize the accumulation of flammable fumes. LP-gas containers shall not be filled, and removable LP-gas containers shall not be exchanged near open pits, underground entrances, elevator shafts or other similar areas.

3.4.4.2 Smoking shall be prohibited in refuelling areas which shall be indicated by signs.

3.4.4.3 Liquid fuels, not dispensed from approved pumps, shall be handled in closed containers.

3.4.4.4 LP-gas containers shall be recharged or exchanged only by trained and designated personnel.

3.4.4.5 LP-gas containers shall be stored and transported with the service valve closed and the safety valve in direct communication with the vapour space of the container. The protective caps provided shall be fitted on the connections when containers are stored.

3.4.4.6 LP-gas containers shall be inspected to ensure that no vapour leakage exists before recharging and/or reusing. Particular attention shall be given to the valves and connections. Damaged containers shall not be used. Repairs may be made only by authorized firms.

3.4.5 *Battery Charging and Changing*

3.4.5.1 Battery charging installations shall be located in areas designated for that purpose. Facilities shall be provided for flushing and neutralizing spilled electrolyte, for fire protection, for protecting charging apparatus from damage by trucks, and for adequate ventilation for dispersal of fumes from gassing batteries.

3.4.5.2 Smoking shall be prohibited in charging areas and shall be indicated by signs.

3.4.5.3 Only trained and authorized personnel shall change or charge batteries. Personnel maintaining batteries shall wear protective clothing.

3.4.5.4 All battery changing shall be carried out in accordance with manufacturer's instruction. When reinstalling batteries, means provided for correctly connecting, positioning and securing shall be used. Tools and other metallic objects shall be kept away from the top of uncovered batteries.

3.4.5.5 The battery of an electric truck shall not be replaced by another battery having a different voltage, mass or size, without specific authorization by the original manufacturer of the truck. Means shall be provided for the safe changing of batteries. A properly insulated spreader bar shall be provided for use with any overhead hoist.

3.4.5.6 A chain hoist, if used, shall be equipped with a load-chain container. If a hand hoist is used, uncovered batteries shall be covered with a sheet of plywood or other non-conducting material to prevent the hand chain from shorting on cell connectors or terminals.

3.4.6 *Defective or Damaged Trucks*

3.4.6.1 If a powered industrial truck is found to be in any way unsafe or to contribute to an unsafe condition, it shall be removed from service until restored to a safe operating condition.

3.4.7 *Accidents*

3.4.7.1 The operator shall be required to report any accident involving injury, damage to building structures or equipment to the appropriate person at once.

3.5 *Operating Conditions*

3.5.1 *Aisles and Stacking Areas*

3.5.1.1 Operating surfaces shall have sufficient load-carrying capacity and shall be maintained in such a manner as not to affect adversely the safe operation of the truck.

3.5.1.2 Transport aisles for trucks shall be arranged to provide good visibility and ease of truck cornering, and shall avoid inclines, steep ramps, narrow passages and low ceilings. Aisles shall be clearly outlined or defined.

3.5.1.3 In aisles where pedestrian traffic is likely to be encountered, aisle width shall be adjusted accordingly.

3.5.1.4 Markers shall be installed if permanent gradients exceed 10 percent.

3.5.1.5 Gradient shall provide for a smooth gradual change at top and bottom to prevent shock to the load or fouling of underside of the trucks.

3.5.1.6 If, under travelling (that is transporting) conditions, the load obstructs visibility, trucks shall be driven with load trailing.

Note — Under certain conditions (for example stacking or negotiating certain gradients) where movement with the load leading is required, the truck shall be driven with extreme care. Attention shall be given to providing such ancillary (auxiliary) means or additional persons as necessitated by the operating conditions.

3.5.1.7 Aisles, roadways, passageways, floors or ramps shall be maintained in good operating conditions in order to prevent damage to the truck or load and not to impair the stability.

3.5.1.8 Hazardous conditions, including overhead obstructions, shall be prominently indicated.

3.5.1.9 Fire aisles, access to stairways, and fire equipment shall be kept clear.

3.5.2 *Bridge Plates and Dockboards*

3.5.2.1 All bridge plates or dockboards shall have an adequate safety margin to support loaded trucks. The maximum load shall be shown on the plates, clearly and permanently.

3.5.2.2 Bridge plates or dockboards shall be secured to prevent accidental movement, rocking or sliding.

3.5.2.3 Grab handles, or other effective means, shall be provided on bridge plates to permit safe handling. Where possible, fork loops or lugs should be provided for handling by fork trucks.

3.5.2.4 Bridge plates and dockboards should have slip-resistant surface.

3.5.2.5 The sides of all bridge plates and, where practicable, dockboards shall be provided with means to minimize the possibility of trucks running over the edge.

3.5.2.6 When bridge plates or dockboards are in place, means shall be provided to guard against unintentional movement of the vehicle being boarded.

3.5.3 *Lighting*

3.5.3.1 Lighting of adequate intensity shall be provided in operating areas.

3.5.3.2 When lighting in the operating area is less than 32 lux (3 cd), auxiliary lighting shall be provided on the truck.

3.5.4 *Slings of Trucks*

3.5.4.1 Slings shall be attached only at the points indicated by the truck manufacturer.

3.5.5 *Simultaneous Use of Trucks*

3.5.5.1 The simultaneous use of two trucks for handling heavy or cumbersome loads is a dangerous operation requiring special precautions. It shall be done only in exceptional circumstances, under the supervision of the person responsible for handling operations.

3.5.6 *Lifts (Elevators)*

3.5.6.1 It shall be ensured that lifts (elevators) used to transport powered industrial trucks will support the total mass of the truck, load, and operator. Such lifts (elevators) shall be designated, and operators instructed to use only designated lifts (elevators).

3.5.7 *Operation in Road Vehicles (Trailers) or Railway Wagons*

3.5.7.1 Before entering a road vehicle, it shall be confirmed that brakes have been applied and the wheels chocked to prevent movement.

NOTE — Wheel chockes may not be required when the road vehicle is equipped with automatic positive locking spring-applied parking brakes.

3.5.7.2 When powered industrial trucks are driven on and off a semi-trailer not coupled to a tractor, sports may be necessary to prevent up-ending of the trailer.

3.5.7.3 It shall be ensured that the flooring system of road vehicles or railway wagons will support the total mass of the industrial truck, load, and the operator. The flooring system shall be checked for breaks, holes or other defects.

4. SAFETY PRACTICES FOR THE OPERATOR

4.1 Only trained persons shall drive or operate powered industrial trucks. Badges or other visual indications shall be displayed on the body of the operator at all times during the working period to show that he is duly authorized to operate such vehicles.

4.2 The operator should not allow any person to travel on the truck forks, attachments or trailers unless such equipment has been specifically designed for this purpose. He should not drive the truck up to a person standing in front of a bench or other fixed object.

4.3 Accidents — The operator should report all accidents involving personnel, building structures, and equipment at once to the appropriate person.

4.4 The operator should look in the direction of travel and keep a clear view of the path along which he is travelling. The operator should slow down and sound the horn at cross aisles and at other places where vision is obstructed. When moving bulky loads that block forward visibility, the operator should drive the trucks with the load trailing.

4.4.1 Operation on main roads outside the factory premises should be permitted only with proper authorization of local transport authority.

4.5 As a general rule the operator should keep to the left side of the aisle and adapt his speed to local traffic conditions. He should maintain a reasonable distance from vehicles ahead and always have control of his truck.

4.6 The operator should avoid making fast starts, sudden stops and quick turns and keep truck under control at all times.

4.7 The operator should not overtake any vehicle at a crossing, or at any point of limited visibility.

4.8 The operator should not carry loads heavier than those for which the truck is rated.

4.9 The operator should carry loads which are safely arranged, and when handling off-centre loads which cannot be centred, the truck should be operated with caution.

4.10 The operator should make sure there is sufficient headroom so that he and the laden truck can pass safely.

4.11 The operator should not run his truck on to an elevator or lift, he should make certain that it would support the mass of the truck, including his own and that of the load.

4.12 The operator should operate the loaded truck within the prescribed gradients of truck. He should also not turn his truck on a gradient.

4.13 The load on a pedestrian-controlled truck should always enter first in a lift or other confined areas.

4.14 When on the elevator, the operator should neutralize the controls, shut off the power and set the brakes. It is advisable that all personnel should leave the elevator or lift before the truck is allowed to enter or leave.

4.15 Before crossing a bridge plate, the operator should make sure that it is secured and the truck is properly aligned with it, and should cross slowly and carefully.

4.16 To prevent an accumulation of fumes and gases in enclosed or semi-enclosed areas, the operator should avoid unnecessary periods of idling.

4.17 When leaving his truck unattended, the operator should ensure that controls are in neutral, power shut off, brakes applied, key or connector plug removed, if on an incline, the wheels should also be chocked.

4.18 When at any time a powered industrial truck is found to be defective the operator should report the matter immediately to the appropriate authority and no person should be allowed to operate the truck until the fault has been rectified.

4.19 Suitable board to indicate that truck is out of order should be displayed.

4.20 Unless specifically authorized to do so, the operator should not make repairs, alterations or adjustments to the equipment.

4.21 The operator should not operate the truck with a leak in the fuel system until the leak has been corrected.

4.22 The operator under all conditions should operate the truck at a speed which will permit him to be brought to a stop in a safe manner. He should adapt the speed to the road surface, visibility and load. He should slow down for wet and slippery floors.

4.23 Supplementary Instructions for Fork Lift Truck Operations

4.23.1 When the operator leaves his truck, he should ensure that the forks are left on the ground.

4.23.2 The operator should not allow anyone to stand or walk under elevated forks or attachments, whether loaded or empty.

4.23.3 The operator should always work within the limits of the rated capacity of the truck and its attachments. He should neither add supplementary counterweights nor additional personnel to increase the capacity of the machine.

4.23.4 To ensure stability of the load the operator should set the forks sufficiently far apart and insert them as far as possible under the load.

4.23.5 The operator should carry the load as low as possible, consistent with safe operation, with the mast tilted backward.

4.23.6 The operator should use forward or backward tilting of the mast with load with the utmost care. He should use total range of forward and backward tilting close to the ground level only. The mast/uprights should not be tilted forward with the carriage elevated except to pick or deposit a load on the stack. Tilting of mast/uprights should be avoided when the truck is moving.

4.23.7 On level ground, the truck should be driven with the loaded end either in the rear or in the front as may be convenient to obtain the maximum visibility.

4.23.8 On inclines and ramps, the truck should be driven slowly. The loaded end should always face uphill both while ascending and descending except that an unloaded non-counterbalanced truck should be operated with the loading end facing downhill.

4.23.9 The truck should not run over loose objects which are likely to damage the truck or affect the persons nearby.

4.23.10 The operator should not put arms or legs between the uprights of the mast or outside the running lines of the truck.

4.23.11 When stacking, the operator should follow the following basic procedures:

- a) Approach the stack at low speed and with the mast tilted 3 to 5° backward;
- b) Lift the load slightly over the stacking height and move forward;
- c) When the load is over the stack, bring the mast to the vertical position;
- d) Deposit the load on the stack;
- e) Ensure that the load is securely stacked;
- f) Free the forks from the load by lowering the forks and/or by tilting the mast forward; and
- g) Reverse from the stack and lower the forks to the travelling position.

4.23.12 When removing a load from a stack the following procedures should be followed:

- a) Approach stack and stop with forks about 0.3 m from the stack;
- b) Check that fork width is suitable and weight of load is within truck capacity;
- c) Adjust tilt and raise forks into position;
- d) Move slowly forward, inserting the forks into the fork pockets until heels of forks are against the load;
- e) Raise forks until load is just clear of stack and apply partial rear tilt;
- f) Ensure that the way is clear and reverse away from stack sufficiently to clear load; and
- g) Lower load to travelling position, tilt fully backwards and move off steadily.

NOTE — The speed with which procedures described in 4.23.11 and 4.23.12 are carried out will depend on floor conditions.

5. MAINTENANCE PRACTICES

5.0 Satisfactory operation of powered industrial truck depends on careful maintenance. When maintenance is neglected trucks can become a source of danger to personnel and property.

5.1 Maintenance Items — Preventive maintenance, lubrication, and inspection of all powered industrial trucks shall be performed according to a scheduled system in conformity with the following items and, in particular, with the manufacturer's recommendation, which should accompany the truck when delivered:

- a) Only qualified and authorized personnel shall be permitted to maintain, repair, adjust and inspect industrial trucks.
- b) Brakes, steering mechanisms, control mechanisms, warning devices, lights, governors, and lift overload protection devices shall be maintained in a safe operating condition.
- c) All parts of lift and tilt mechanisms and frame members shall be carefully and regularly inspected and maintained in a safe operating condition.
- d) Safety guards and safety devices shall be inspected regularly and shall be maintained on the truck in a safe operating condition.
- e) All hydraulic systems shall be regularly inspected and maintained.
- f) Cylinders, valves and other similar parts shall be checked to ensure that neither internal nor external leakage has developed to the extent that it would create a hazard.
- g) Batteries, motors, controllers and contactors, limit switches, protective devices, electrical conductors and connections shall be inspected and maintained in accordance with generally accepted good practice. Special attention shall be paid to the condition of electrical insulation.
- h) Exhaust system and adjustment of carburettor, evaporator and fuel pump of internal combustion engine trucks shall be checked with regard to damage and leakage.

Caution : During maintenance, the operation of internal combustion engines in confined areas can produce noxious substances. Adequate ventilation is recommended when internal combustion engines are operated in such confined areas.

- j) Pneumatic tyres shall be checked for deterioration of bearing surface, side walls, and rims. The inflation pressure specified by the truck manufacturer shall be maintained. Before demounting pneumatic tyres on split rims, precautions shall be taken to ensure that the internal pressure has been completely relieved.

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- k) The bonding of solid tyres to the metal bands or the rims shall be checked and foreign matter removed from the treads, if necessary.
- m) All information and instruction plates and tags (decals) shall be maintained in a legible condition.
- n) The fuel system shall be checked for leaks and the soundness of all fittings. LP-gas systems shall be checked for leaks by using a soap solution. In the case of leakages in the fuel system, the truck shall be taken out of service and shall not be returned to service until all leaks have been remedied.
- p) All LP-gas containers shall be examined before recharging, and all removable LP-gas containers shall be examined before re-use for the following defects or damage:
 - 1) Dents, scrapes and gouges;
 - 2) Damage to valves and liquid level gauge;
 - 3) Debris in the relief valve;
 - 4) Damage to or loss of relief valve cap;
 - 5) Indications of leakage at valves or threaded connections; and
 - 6) Deterioration, damage or loss of flexible seals in the filling or servicing connections.

Where defects and/or damage are discovered, LP-gas containers shall not be used until all such defects and/or damage has (have) been satisfactorily remedied.

- q) Any design modifications and additions liable to influence capacity and operating safety shall be effected only after approval of the manufacturer. Applicable identification plates and instructions shall be changed.
- r) All replacement parts shall be original parts or be of a quality at least equal to that provided in the original equipment.
- s) Industrial trucks shall be kept in a clean condition to prevent fire hazards and ensure the detection of loose or defective part. Attention shall be given to lifting and load-carrying devices, pedals, footsteps, and truck floor such that they are clean of grease, oil, dirt, etc.
- t) Maintenance of trucks working in hazardous areas shall be in accordance with IS : 8790 (Part I)-1978*; and IS : 8790 (Part II)-1978†.

*General requirements of powered industrial trucks working in hazardous areas:
Part I Internal combustion engine powered trucks.

†General requirements of powered industrial trucks working in hazardous areas:
Part II Electric-battery-powered industrial trucks.

5.2 Inspection

5.2.1 If during an inspection, any fault, wear or damage is observed that can cause a safety hazard, effective measures for correction shall be taken before the truck is placed into operation again.

5.2.2 A scheduled preventative maintenance, lubrication and inspection procedure should be followed. Those records determined to be necessary (or required by national authority) shall be maintained.

5.2.3 An example of check form which may be used when inspecting a truck is given in Appendix A.

APPENDIX A

(Clause 5.2.3)

EXAMPLE OF A CHECK FORM

 Industrial truck No. Sheet No.

'Basic dimension' for checking-leaf or balance chains or roller chains,
respectively: mm

Admitted minimum fork thickness:

REGULAR CHECK

Checks were carried out at:

- | | |
|-------------------------------|---|
| A Driving gear | B Lifting gear |
| 1. Steering system | 1. Hydraulic system |
| 2. Braking system | 2. Mast |
| 3. Wheels | 3. Lifting system |
| 4. Chassis | 4. Load suspending devices
forks, platform, attach-
ments |
| 5. Drive control switch | |
| 6. Drive | C Overhead guard |
| | D Other matters |

Date of checking:

Direction:

Executed

on

by

Notice taken by:

.....
(Date and signature of expert)

This original version remains in the checking map
First copy to that one who has to execute the direction

Additional copies to:

.....
(Date and signature of workshop
manager or his commissioner)

INTERNATIONAL SYSTEM OF UNITS (SI UNITS')

Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	Unit	Symbol	Definition
Force	newton	N	1 N = 1 kg.m/s ²
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m ²
Frequency	hertz	Hz	1 Hz = 1 c/s (s ⁻¹)
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m ²

INDIAN STANDARDS INSTITUTION

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